REMARKS / DISCUSSION OF ISSUES

Claims 9-15 are presented for further consideration. No substantive amendments are made to the claims.

Initial Remarks

The Office Action includes certain remarks that are not germane to examination. For example, at the top of page 4, the Office Action postulates on the impetus for certain aspects of a claim. Moreover, at the bottom of page 4, the Office Action postulates what Applicants may have wanted to designate by the term 'trench.'

Applicants respectfully submit that the impetus of an invention in the context of a rejection based on art is not germane, and Applicants' substantive silence on this issue raised by the Office Action is by no means acquiescence to the assertion. Furthermore, the sentence terminating with a quote from the *Halliburton* opinion seems to be incomplete, rendering its meaning unclear.

Furthermore, the meaning of the term 'trench' as it applies to the present application is left to claim interpretation as provided by applicable law. Again, Applicants' substantive silence on this matter raised by the Office Action is by no means acquiescence to the assertion.

Request for Substantive Examination of Claim 13

Claim 13 recites:

A method of forming a silicon-on-insulator photodiode, comprising:

providing an SOI structure including a silicon substrate, a buried oxide layer formed on the silicon substrate; a silicon layer formed on the buried oxide layer, and a field oxide layer formed on the silicon layer;

adjusting a thickness of the silicon layer by adjusting a thickness of the field oxide layer, wherein an amount of incident light passing through the SOI photodiode to the

silicon substrate with respect to wavelength is proportional to the thickness of the silicon layer;

forming a trench to expose a portion of the silicon substrate; and

forming a contact in the trench.

After a rather lengthy discourse on the disclosure surrounding the disclosure of Fig. 8 of *Merrill, et al.* (US Patent Publication 2005/0087829), the Office Action states: "The structures and method of manufacturing as presented by claim 9 and 13 us seen as being clearly anticipated by that of Merrill."

In the two pages comprising approximately 50 lines describing Fig. 8 of *Merrill, et al.* and its alleged relevance to the claims under examination, there is no mention of many aspects of claim 13. To this end, Applicants are not directed to the alleged teachings of *Merrill, et al.* for certain features of claim 13. For example, claim 13 recites adjusting *a thickness of the silicon layer by adjusting a thickness of the field oxide layer*, yet the Office Action fails to direct Applicants to the alleged disclosure in the applied art of this aspect of the method. While the Office Action does assert that "layer 47 that is formed on the silicon layer 45 being of silicon dioxide is a 'field oxide layer'" there is no disclosure of its being adjusted as specifically recited in claim 13. Moreover, and as described more fully herein, there is no disclosure that layer 45 is a field oxide (FOX) layer as asserted.

Based on the at least the above, Applicants respectfully submit that the Office Action fails to comply with MPEP § 706, which states, in part:

> The goal of examination is to clearly articulate any rejection early in the prosecution process so that the applicant has the opportunity to provide evidence of patentability and otherwise reply completely at the earliest opportunity (emphasis added).

The rejection likewise fails to comply with 37 CFR § 1.104(c) (2), which provides:

> In rejecting claims for want of novelty or for obviousness, the examiner must cite the best references at his or her command. When a reference is complex or shows or describes inventions other than that claimed by the applicant, the particular part relied on must be designated as nearly as practicable. The pertinence of each reference, if not apparent, must be clearly explained and each rejected claim specified (emphasis added).

Thus, and for at least the reasons set forth above, Applicants respectfully submit that the Office Action fails to clearly articulate the rejection of claim 13; and that the particular part of the applied art relied upon for at least one feature of claim 13 has not been designated. This renders the rejection of claim 13 improper; and Applicants respectfully request full and complete examination compliant with the noted sections of the MPEP and Rules of Practice. If such examination results in a rejection, Applicants respectfully submit that this rejection cannot be made final.

Rejections under 35 U.S.C. § 102

Claims 9-15 are rejected under 35 U.S.C. § 102(e) as being anticipated by *Merrill, et al.* (US Patent Publication 2005/0087829) and *Merrill, et al.* (US Patent 6,934,050). For at least the reasons set forth below, Applicants respectfully submit that this rejection is improper and should be withdrawn.

At the outset Applicants rely at least on the following standards with regard to proper rejections under 35 U.S.C. § 102. Notably, a proper rejection of a claim under 35 U.S.C. § 102 requires **that a single prior art reference disclose each element of the claim**. *See, e.g., W.L. Gore & Assoc., Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ

303, 313 (Fed. Cir. 1983). Anticipation requires that each and every element of the claimed invention be disclosed **in a single prior art reference**. *See, e.g., In re Paulsen,* 30 F.3d 1475, 31 USPQ2d 1671 (Fed. Cir. 1994); *In re Spada*, 911 F.2d 705, 15 USPQ2d 1655 (Fed. Cir. 1990). Alternatively, anticipation requires that each and every element of the claimed invention be embodied in a single prior art device or practice. *See, e.g., Minnesota Min. & Mfg. Co. v. Johnson & Johnson Orthopaedics, Inc.,* 976 F.2d 1559, 24 USPQ2d 1321 (Fed. Cir. 1992). For anticipation, there must be no difference between the claimed invention and the reference disclosure, as viewed by a person of ordinary skill in the field of the invention. *See, e.g., Scripps Clinic & Res. Found. v. Genentech, Inc.,* 927 F.2d 1565, 18 USPQ2d 1001 (Fed. Cir. 1991).

i. Application of secondary reference in rejection for anticipation is improper

From the applicable law provided above, it is clear that a rejection for anticipation must be established based on a single reference. While rejections based on inherency may direct an applicant to extrinsic evidence, Applicants respectfully submit that the present rejection applies the secondary reference, *Merrill, et al.* '50, not to establish that a particular feature of a claim is inherent in the primary reference, but as a basis for structure. Specifically, the reference is applied allegedly to show structures of stacked photodiodes with multiple color detectors. However, it is not clear from any aspect of the rejection that there is a feature of any of claims 9-13 that is allegedly inherent. Thus, it is unclear how the secondary reference relates to the claims under examination; and it appears that it cannot be applied for an issue of inherency as one has not been raised. As such, because citation of a secondary reference for other than extrinsic evidence in a claim of inherency is improper. For at least this reason, Applicants respectfully submit that the rejection of claims 9-15 is improper and should be withdrawn.

ii. Functional language must be considered

In *Microprocessor Enhancement Corp. v. Tex. Instruments*, 2007-1249, -1286, 2008 U.S. App. LEXIS 6837, (Fed. Cir. April 1, 2008) the CAFC held "The functional

language is, of course, an additional limitation in the claim. *See, e.g., Wright Med. Tech., Inc. v. Osteonics Corp.*, 122 F.3d 1440, 1443-44, 43 U.S.P.Q.2D (BNA) 1837, 1840 (Fed. Cir. 1997) (functional language analyzed as a claim limitation)."

Thus, functional language is a claim limitation(s), requiring full consideration by the Examiner.

Claim 9 recites:

A silicon-on-insulator (SOI) photodiode, comprising:

a silicon substrate having a first portion doped with a first dopant type and a second portion doped with a second dopant type, the first and second portions forming a pn-junction;

a buried oxide layer formed on the silicon substrate;

a silicon layer formed on the buried oxide layer, wherein an amount of incident light passing through the SOI photodiode to the silicon substrate with respect to wavelength is proportional to a thickness of the silicon layer;

a field oxide layer formed on the silicon layer, ***wherein a thickness of the field oxide layer controls the thickness of the silicon layer****;*

a trench extending to the silicon substrate; and

a contact formed in the trench.

In rejecting claim 9, the Office Action states:

> "The function of 'wherein a thickness of the field oxide layer controls the thickness of the silicon layer'...does not add anything to the claimed invention...and is just an inherent property of the arrangement."

At the outset, Applicants note that the functional language must be considered and given patentable weight, and cannot be dismissed as an inherent feature without basis in law to do so. In particular, the controlling of the thickness of the silicon layer (e.g., 16 of the filed application) provided below the FOX layer provides control of the function of the device. This functional language must be considered and the determination of

patentability of claim 9, for example, requires its consideration. Thus, the rejection of claim 9 is improper for at least this reason.

iii. Inherency not established

As noted in ii. above, the feature ***a thickness of the field oxide layer controls the thickness of the silicon layer*** specifically recited in claim 9 is dismissed as being inherent. First, and as discussed below, Applicants respectfully submit that the FOX layer as claimed is provided over an Si layer, let alone to control its thickness. Moreover, and as is known, M.P.E.P. § 2112 IV provides that:

> *EXAMINER MUST PROVIDE RATIONALE OR EVIDENCE TENDING TO SHOW INHERENCY*
>
> *The fact that a certain result or characteristic* ***may*** *occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic. In re Rijckaert, 9 F.3d 1531, 1534, 28 USPQ2d 1955, 1957 (Fed. Cir. 1993) (reversed rejection because inherency was based on what would result due to optimization of conditions, not what was necessarily present in the prior art); In re Oelrich, 666 F.2d 578, 581-82, 212 USPQ 323, 326 (CCPA 1981). "****To establish inherency, the extrinsic evidence 'must make clear that the missing descriptive matter is necessarily present in the thing described in the reference****, and that it would be so recognized by persons of ordinary skill. Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient.' " In re Robertson, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999).*(emphasis added).

Furthermore, a claim rejection must be based on objective evidence of record, and

cannot be supported merely on subjective belief and unknown authority. See, e.g., M.P.E.P. § 2144.03; In re Lee, 277 F.3d at 1344-45, 61 USPQ2d at 1434-35 (Fed. Cir. 2002); In re Zerko, 258 F.3d at 1386, 59 USPQ2d at 1697.

No such concrete evidence to establish that it is inherent to control the thickness of a silicon layer via a FOX layer has been provided by the Examiner here, nor did the Examiner submit an affidavit as required by 37 C.F.R. § 1.104(d)(2) if this proposed motive were based on facts within his personal knowledge (see M.P.E.P. § 2144.03). Applicants respectfully request that such an affidavit be provided if a rejection continues to be made without a citation of any objective evidence.

iv. The applied art fails to disclose at least one feature of each of claims 9 and 13

Claim 9 features, inter alia, *a field oxide layer formed on the silicon layer.* Claim 13 features, inter alia, *providing an SOI structure including a silicon substrate, and a field oxide layer formed on the silicon layer*; and *adjusting a thickness of the silicon layer by adjusting a thickness of the field oxide layer.*

The Office Action directs Applicants to insulation layer 47 of *Merrill, et al.* for the alleged disclosure of the FOX layer. Applicants respectfully submit that this is not disclosed in the applied art. Notably, *Merrill, et al.* discloses:

> FIG. 8 is a cross-sectional view (in a vertical plane) of a portion of one embodiment of an array of the inventive VCF sensor groups which includes two non-sensor filters (layers 43 and 48) and four insulation layers (diffusion barriers 42, 44, 47, and 48). Each insulation layer can consist of silicon dioxide.

However, there is no disclosure or suggestion that the layer is a FOX layer as claimed; or the control of the Si thickness with the FOX layer; or that the thickness of the FOX layer is adjusted as specifically claimed. Moreover, layer 47 is described as providing a **diffusion barrier** for dopant diffusion. So, not only is there no disclosure of a FOX layer to control thickness of an Si layer as claimed, but also the import and function of this layer is for diffusion blocking!

Accordingly, and for at least the reasons set forth above, Applicants respectfully submit that the applied art fails to disclose at least one feature of each of claims 9 and 13. Thus, a *prima facie* case of anticipation cannot be established based on *Merrill, et al.* and claims 9 and 13 are patentable over the applied art.

v. General comments on rejections of dependent claims

Since each of the dependent claims depends from a base claim that is believed to be in condition for allowance, Applicant believes that it is unnecessary at this time to argue the allowability of each of the dependent claims individually. Applicant does not, however, necessarily concur with the interpretation of any dependent claim as set forth in the Office Action, nor do Applicant concurs that the basis for the rejection of any dependent claim is proper. Therefore, Applicant reserves the right to specifically address the patentability of the dependent claims in the future, if deemed necessary.

Conclusion

In view the foregoing, applicant(s) respectfully request(s) that the Examiner withdraw the objection(s) and/or rejection(s) of record, allow all the pending claims, and find the application in condition for allowance.

If necessary, the Commissioner is hereby authorized in this, concurrent, and further replies to charge payment or credit any overpayment to Deposit Account Number 50-0238 for any additional fees, including, but not limited to, the fees under 37 C.F.R. §1.16 or under 37 C.F.R. §1.17.

If any points remain in issue that may best be resolved through a personal or telephonic interview, the Examiner is respectfully requested to contact the undersigned at the telephone number listed below.

Respectfully submitted on behalf of:

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